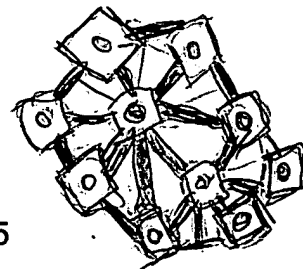


# PATENT ABSTRACTS OF JAPAN



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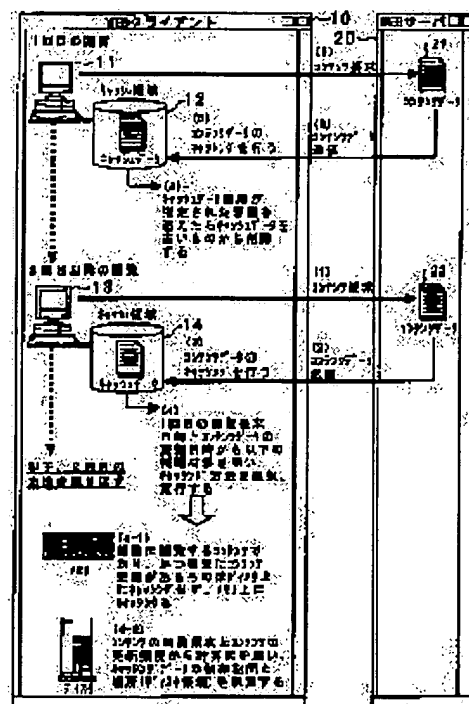
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## (54) OPTIMUM CACHING MANAGING METHOD OF WEB CLIENT AND ITS SYSTEM

### (57)Abstract:

PROBLEM TO BE SOLVED: To optimally manage a WEB caching of newest and required data by the update frequency and reading the frequency of contents viewed.

SOLUTION: In this optimum caching managing method, the content updating frequency at a WEB server 20 and the reading frequency at a WEB client 10 are analyzed to decide the keeping period and the arranging place of cache data according to the analyzing result, and contents, which is read frequently at the web client and frequently updated at the WEB server are stored on the memory of the WEB client, without storing in cache areas 12, 14 on a disk by the WEB client.



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## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the approach and system which decide on the maintenance period and arrangement location of suitable cache data especially about the cash advance management method in the client which peruses contents from a WEB (Webb) server.

[0002]

[Description of the Prior Art] The conventional WEB browser is cyclically accumulated to the temporary disk field of the off-line working-level month which specified all the contents data perused from the WEB server. The contents data stored to this temporary disk field are called "cache data", and that field is called "cache field."

[0003] However, in the are recording management method of the conventional cache data, the data perused frequently and the contents data which updating applies frequently will also be held to the cache field, and pressure of a disk field and the fall of the processing speed of CPU will be caused.

[0004] Drawing 6 is drawing for explaining the cache data control approach in the conventional WEB client. If drawing 6 is referred to, and the WEB client 10 gives a contents demand to the WEB server 20, contents data will be transmitted from (1) and the WEB server 20, and the cash advance of contents data will be performed in (2) and a WEB client. The newest thing will be overwritten if there are already the same contents in that case (3). Moreover, when a cache field exceeds assignment capacity, the cache data currently kept to the cache field are deleted from an old thing (4). If the WEB client 10 gives a contents demand to the WEB server 20 again, contents data will be transmitted from the WEB server 20, and the perusal cycle of performing the cash advance of contents data will be repeated in the WEB client 10.

[0005]

[Problem(s) to be Solved by the Invention] As described above, since all the cash advance data incorporated from the server were saved at the WEB client side, in the conventional WEB client system, it has the trouble of disk partitioning of a lot of cash advance data being needed, or reducing the processing engine performance in order to carry out CPU use generating, the useless file IO and.

[0006] Therefore, this invention is made in view of the above-mentioned trouble, and the purpose is in offering the approach and system which enable management of the WEB cash advance of the newest and required data the optimal with the updating frequency and perusal frequency of contents.

[0007]

[Means for Solving the Problem] This invention which attains said purpose analyzes the renewal frequency of contents in a WEB server, and the perusal frequency in a WEB client, and decides on the maintenance period and arrangement location of the cache data according to this analysis result. Namely, the numeric value as which this invention was determined according to the size of the perusal frequency of the contents in a WEB client, The retention period of cash advance data [ in / based on a formula predetermined from the numeric value defined according to the size of the updating frequency of the contents of a WEB server / a WEB client ], The contents which are frequently perused by said

WEB client and by which it decides on a storage area, and updating is frequently made by said WEB server are not kept to the cache field on a disk, but are kept on the memory of said WEB client.

[0008]

[Embodiment of the Invention] The gestalt of operation of this invention is explained. Drawing 1 is drawing for explaining the WEB cash advance management method of the gestalt of 1 operation of this invention. In the gestalt of 1 operation of this invention, if drawing 1 is referred to, if the WEB client 10 gives a contents demand to the WEB server 20, contents data will be transmitted from (1) and the WEB server 20, and the cash advance of contents data will be performed by (2) and the WEB client 10 on the occasion of the 1st perusal, (3). When a cache field exceeds assignment capacity at that time, the cache data currently kept to the cache field are deleted from an old thing ((4) -1).

[0009] In perusal of the 2nd henceforth, if the WEB client 10 gives a contents demand to the WEB server 20, contents data will be transmitted from (1) and the WEB server 20, and the cash advance of contents data will be performed by (2) and the WEB client 10 (3). In that case, from the 1st perusal demand time information and the updating time information on contents data, as it is the following, the cash advance approach is chosen and performed (4).

[0010] That is, based on a predetermined formula, it decides on a storage area as the retention period of cash advance data from the perusal frequency of the contents in the WEB client 10, and the updating frequency of the contents in the WEB server 20. For example, it is the contents perused frequently, and the cash advance of the contents by which updating is made frequently is not carried out on a disk, but they carry out a cash advance on memory till termination of a WEB browser. In a detail, a WEB client is set more at perusal of the 2nd henceforth. The contents demand to a WEB server, Updating time information is transmitted to said WEB client with contents from said WEB server. In a WEB client This reference time information on these contents, and the updating time information which computed reference frequency information and was received from the last reference time information this time [ of these contents ], From the updating time information received last time, compute updating frequency information, and the rate of relative retention of these contents is computed in a predetermined formula from the numeric value corresponding to this reference frequency information, and the numeric value corresponding to this updating frequency information. With reference to the table which stored beforehand the maintenance period and storage area corresponding to a value of this rate of relative retention, it decides on the maintenance period and storage area of contents.

[0011]

[Example] The example of this invention is explained with reference to a drawing.

[0012] Drawing 2 is drawing for explaining one example of this invention, and is drawing showing the process of 1st refer to the WEB contents.

[0013] The contents on the WEB server 20 shall be referred to for the first time using a WEB browser from the client terminal 10.

[0014] When perusing the contents for the first time, the client terminal 10 requires contents data (step S10). The WEB server 20 transmits the updating time -1 to the client terminal 10 with contents data (step S11). It is accumulated as cache data to the cache field of the client terminal 10.

[0015] Time and renewal time of contents-1\*\* by which the contents were updated is recorded on the cache data of the contents referred to as an attribute in that case.

[0016] In addition, the cache field of a client terminal is lacking, when the cache data of new contents cannot be saved, old cache data are eliminated (step S14), and the cache data of new contents are stored.

[0017] Moreover, it decides on the time (contents reference time -1) which referred to contents for the first time as coincidence (step S12), and records on cache data as an attribute (step S15). The renewal time -1 of contents and the contents reference time -1 are stored in a cache field with contents data.

[0018] Drawing 3 is drawing for explaining actuation of one example of this invention, and is drawing showing the process of refer to [ of the 2nd henceforth ] the WEB contents.

[0019] Suppose that the contents referred to using the WEB browser before on the WEB server 20 from the client terminal 10 are referred to. The WEB server 20 receives the demand of the contents data from the client terminal 10 (step S20), and transmits contents data (step S21).

[0020] The time (renewal time -2 of contents) by which the contents were updated on the WEB server 20 is recorded on the contents data referred to, i.e., the contents data transmitted from the WEB server 20, as an attribute.

[0021] Moreover, at the client terminal 10, it holds in memory by making into an attribute time (contents reference time -2) which referred to the contents from the WEB server. Moreover, it decides on the reference time -2 of contents (step S22).

[0022] The time (renewal time -2 of contents) by which the contents concerned were updated, and the time (contents reference time -2) which referred to contents, The time by which the contents of the contents data referred to before the cache field were updated (renewal time -1 of contents), And the time (contents reference time -1) which referred to contents is compared, and spacing which peruses the contents in a client terminal, and spacing by which the contents in a WEB server are updated are computed (step S23).

[0023] The cash advance approach in a client terminal is determined based on this computed time amount (step S24).

[0024] Spacing which peruses the contents in a client terminal as the method of the decision of the cash advance approach, and spacing by which the contents of a WEB server are updated are tested by comparison to the rate table of WEB cash advance relative retention (refer to drawing 4 ), and the multiplication of the math constant corresponding to these spacing is obtained and carried out.

[0025] This result of an operation is defined as the rate of relative retention, and it decides on a cache data maintain period and a storage area from that rate of relative retention. If drawing 4 is referred to, will make into the rate of relative retention the result of having carried out the multiplication of the math constant corresponding to spacing which peruses the contents in a client terminal, and the math constant corresponding to spacing by which the contents in a WEB server are updated, and it will be made to correspond to the retention period of the cache data according to the value of the rate of relative retention, and will decide on a storage area.

[0026] In addition, spacing which peruses the contents in a client terminal It is the difference (contents reference time -2) (- (contents reference time -1)) of this contents reference time and the last contents reference time. Spacing by which the contents in a WEB server are updated is called for as (renewal time -2 of contents) - (renewal time -1 of contents) from information (renewal time -2 of contents), and information (renewal time -1 of contents).

[0027] For example, if drawing 4 is referred to, that whose rate of relative retention is 1.00 saves contents data on memory till termination of a browser. What has a rate of relative retention smaller than 0.99 is saved to a cache field. In addition, when saving contents data to a cache field, a cache data maintain period is added to the time (contents reference time -2) which referred to the contents from the WEB server as contents deletion time, and it is made to record as an attribute.

[0028] In addition, the cache field of a client terminal is lacking, when the cache data of new contents cannot be saved, old cache data are eliminated, and the cache data of new contents are stored (steps S26 and S27).

[0029] Moreover, from the rate table of WEB cash advance relative retention ( drawing 4 ), a contents deletion period is computed by determining the cash advance period corresponding to the rate of relative retention (step S28), the contents reference time -2 and contents deletion time are added to a cache field, and contents data are written in it (step S29).

[0030] Drawing 5 is drawing explaining the actuation at the time of the browser termination in one example of this invention. At the time of WEB browser termination of the client terminal 10, if the thing beyond the contents deletion time of cache data is checked (step S32) and there are corresponding cache data, this will be deleted (step S33) and a WEB browser will be ended.

[0031]

[Effect of the Invention] As explained above, according to this invention, by deciding on the retention period and storage area of contents based on the reference frequency and updating frequency of contents, not carrying out the cache of what has high reference frequency and high updating frequency, or shortening a maintenance period, a disk field is saved, processing of the useless files IO and CPU is

lost, and the effectiveness improve the processing engine performance of a system is done so.

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[Translation done.]